**Supplementary Information**

**Accelerated glacier mass loss in the largest river and lake source regions of the Tibetan Plateau and its links with local water balance over 1976−2017**

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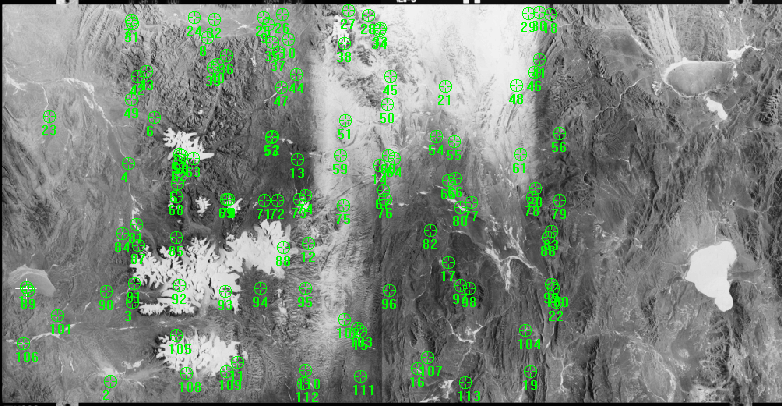
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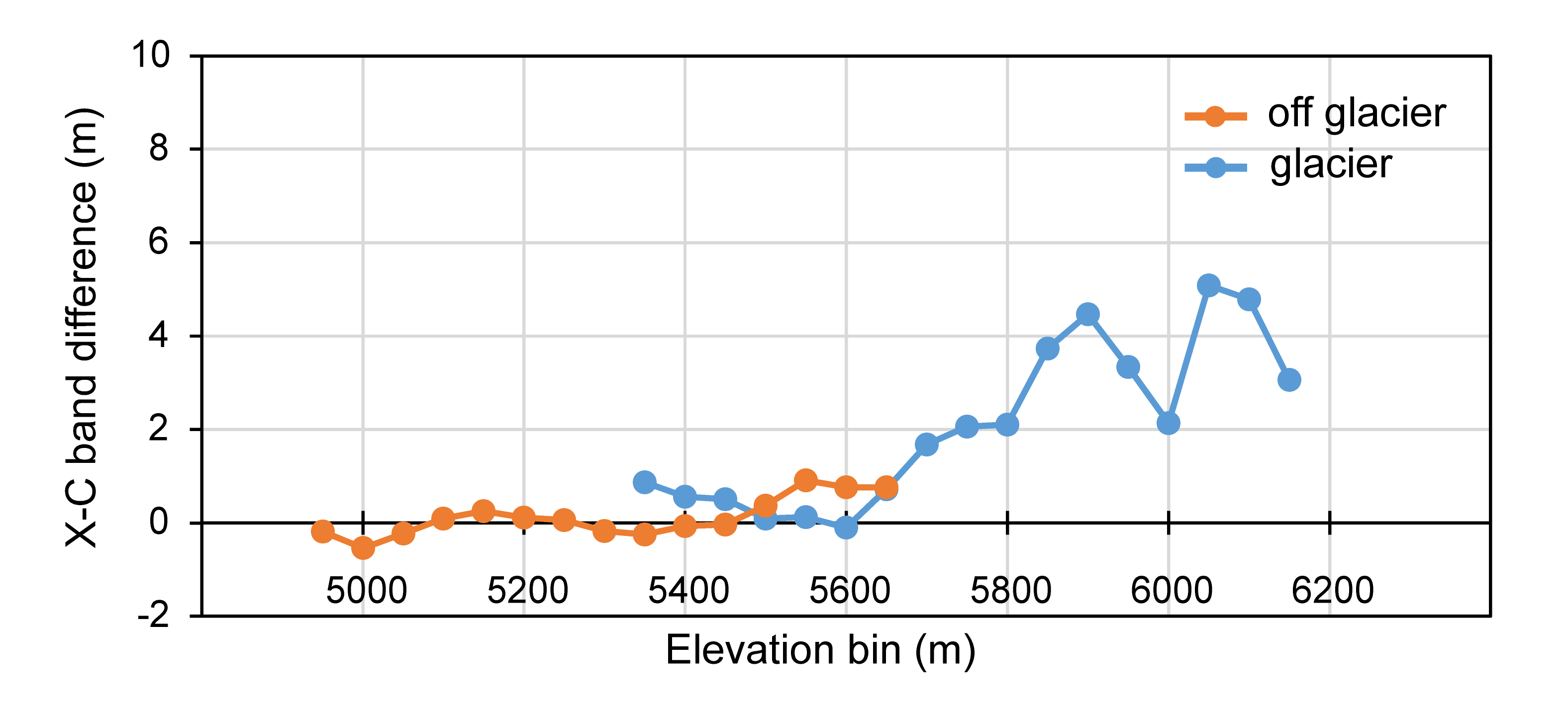
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**Table S1** Parameters used to derive glacier surface elevation change. dx, dy, dz means the shift in the x- y- z- directions. The off-glacier range means the area is not covered by glacier.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Usage | Date | dx (m) | dy (m) | dz (m) | Mean dh in off-glacier region (m) |
| 1976 | 58.41 | -14.93 | -74.85 | 0.14 |
| Elevation change over 2000−2011 | 2011/03/08 | 38.09 | -31.93 | 4.80 | -0.23 |
| 2011/05/13 | 40.16 | -27.26 | 2.18 | -0.00 |
| 2011/06/04 | 31.87 | -23.95 | 1.08 | -0.03 |
| 2011/06/04\_2 | 40.24 | -23.38 | 5.31 | 0.04 |
| 2011/10/03 | 46.89 | -18.07 | 6.51 | -0.07 |
| Elevation change over 2000−2017 | 2014/04/07 | 39.17 | -32.28 | 4.22 | -0.02 |
| 2017/01/08 | 40.21 | -27.18 | 2.18 | -0.02 |
| 2017/01/30 | 31.86 | -23.97 | 1.08 | -0.01 |
| 2017/04/28 | 40.23 | -25.40 | 5.31 | -0.01 |
| Elevation change relative to 2017/01/08 | 2016/09/07 | - | - | - | 0.01 |
| 2017/01/30 | - | - | - | 0.01 |
| 2017/04/17 | - | - | - | 0.02 |
| 2017/05/09 | - | - | - | 0.05 |
| 2017/06/11 | - | - | - | 0.06 |
| 2017/07/03 | - | - | - | 0.02 |
| 2017/09/09 | - | - | - | 0.04 |
| Penetration | SRTM-X | -14.56 | -25.11 | -34.79 | 0.27 |



**Fig. S1** Location of the ground control and tie points used in the generation of KH-9 DEM.



**Fig. S2** Penetration correction using SRTM-X and SRTM-C. The orange indicates the elevation difference after error removal in the off-glacier area. The blue is the elevation difference after error removal in the glacier area. The penetration depth between and X- and C- band is calculated based on the blue line.



**Fig. S3** Elevation change rate in the glacier and off-glacier area over 1976−2000 (upper), 2000−11 (middle) and 2000−17 (bottom). RGI6.0 glacier outlines are shown.



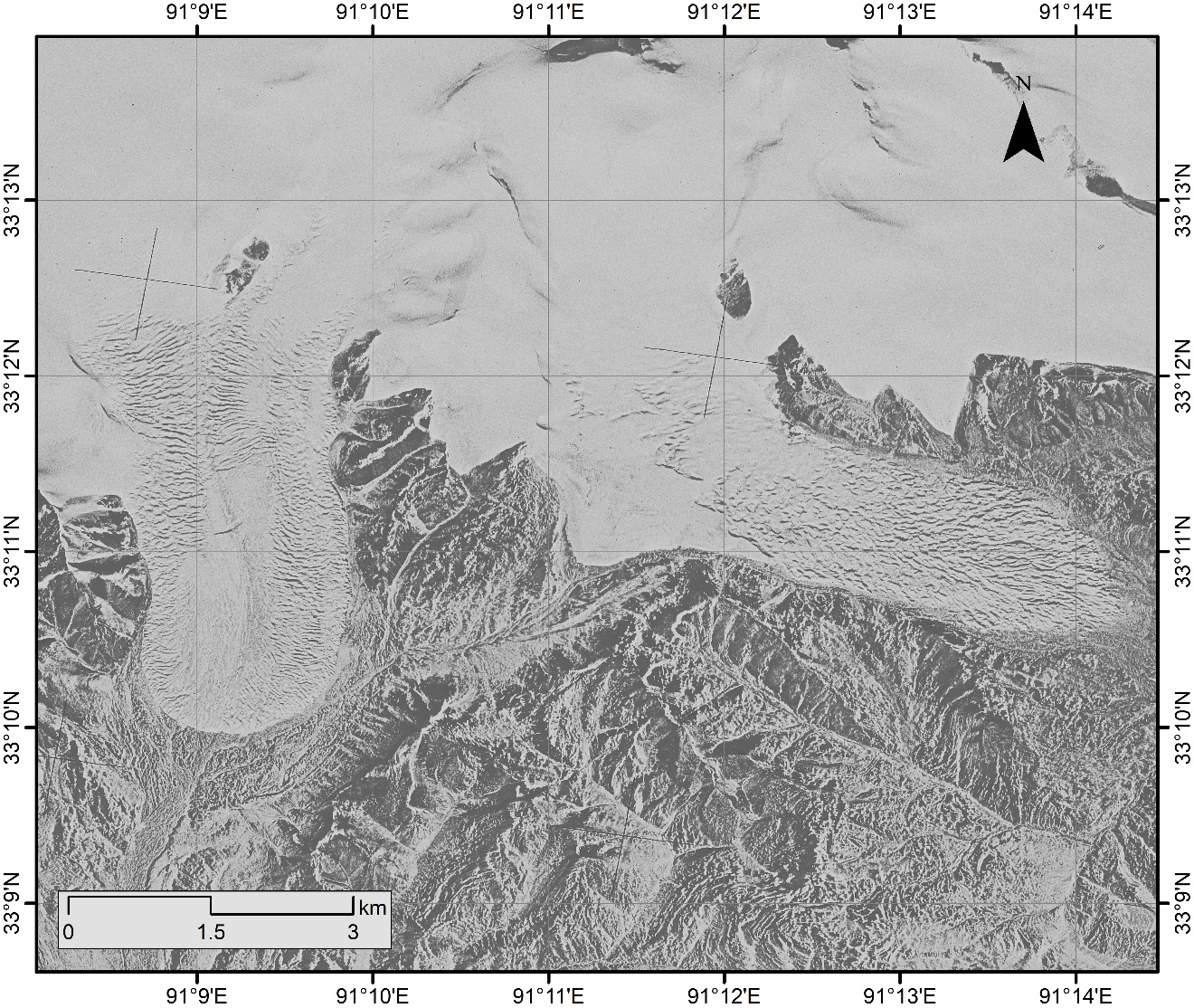
**Fig. S4** Glacier surface elevation change of each glacier with altitude over 1976−2000 (upper), 2000−11 (middle) and 2011−17 (bottom). The median elevation of each glacier is adopted. The black lines are the linear trends.



**Fig. S5** Area change of Selin Co (upper) and ChibzhangCo- Dorsodiong Co (bottom) over 1976−2017.



**Fig. S6** Snow cover condition change detected by MODIS data in the Geladandong region in the spring of 2017. This could alter the properties of the SAR penetration depth.



**Fig. S7** Example of glaciers with rough surface detected by KH-9 on 7 January1976.